

REMARKS

Claim 19-36 are pending; claims 1, 35 and 36 have been amended to limit the invention to the process (method of use) of the combination of elements a) through e) in independent claim 1 and functional language added based on the specification. This amendment does not raise new issues or constitute new matter. Separately, claims 35 and 36, both independent claims to a kit have also been limited to a combination of elements 1) through 4).

The present invention is to a method of using the claimed combination of ingredients to improve the water quality of a biologically maintenance system, e.g. an aquarium, by this unique combination of ingredients which allow microorganisms present in the water system to decompose the ingredients resulting in the desired results indicated for each element in the combination. The functional language indicating results of each component are in the claims. The use of and advantages of the claimed invention are provided in the specification. Aquariums kept over extended periods without water change have the tendency to build up unfavorable, unnatural water conditions which in the extreme develop harmful or even lethal effects for fish, plants and microorganisms. On the other hand, frequent changing of the water is laborious and unpleasant to the aquarianist and disturbing to the fish. The present invention as claimed solves these problems by maintaining the water quality without the need to frequently change the water. The product is unique and marketed under the name "Easy Balance". A copy of the manufacturer's brochure is attached. The prior art fails to teach, suggest or motivate the skilled person in the art to arrive at such a method of use employing the particular combination of ingredients.

Reconsideration of the rejection of the claims, as now amended, is respectfully requested as allegedly obvious over DE 296 17 181 in view of DE 197 04 953, DE 195 33 994, CENTRUM and JP-61-96959.

The three German references fall short in teaching the combination claimed for the purpose claimed. The Examiner has acknowledged the failures of the '181 reference. The additional two German references do not add anything of significance to '181. The Examiner has thus added two additional references, which, in our submission, are irrelevant to the invention as claimed and constitute irrelevant art.

It is well-established patent law that in order to combine references in an obviousness rejection, there must be some suggestion or motivation to make the combination. The first added reference is the pamphlet or brochure for CENTRUM. This is a multivitamin used by humans as a one a day type vitamin. It has absolutely nothing to do with water quality and has the wrong iron salt in the combination of minerals, amino acids, and other ingredients making up the vitamin. Certainly, one skilled in the relevant art of water quality would not have considered this as suggesting it to be combined with the '181 reference to improve the water quality of biological maintenance systems.

The second added reference is a Japanese patent comprising similar ingredients as the CENTRUM multivitamin and some overlap to the ingredients used in the method claimed herein but has been misread and mischaracterized by the Examiner. The Examiner states that the

Japanese reference indicates from the English abstract: "the composition is useful for improving water quality for solutions used in fish breeding." On the contrary, the reference teaches a fish food for injecting into raw or thawed fishes of bait, which is used as a bait for fish raising (breeding). The product contains nutrients and is indicated to have a small change in quality during storage (not to improve water quality in a biological maintenance system). The Abstract states:

PURPOSE: To obtain a bait for fish raising which has a small amount of dissolved nutritive substance during feeding in water, and has small change of quality during storage, by injecting a liquid material of nutritive substances required for fish raising to fishes of bait.

CONSTITUTION: A liquid material such as aqueous solution, emulsion, suspension, etc., of nutritive substances such as vitamins, minerals, amino acids, etc., required for fish raising is prepared, the liquid material is injected to a raw or thawed fishes of bait by a syringe, high-pressure liquid spray column, etc., and if necessary, is stored in a frozen state. (Our emphasis added).

Based on a clear reading of the Abstract of the Japanese reference, one skilled in the relevant art would not have read this reference and obtained any suggestion or motivation to combine it with the '181 reference.

In view of the above, it is respectfully submitted that the Examiner's rejection is unwarranted and should be withdrawn. The present claims are in condition for allowance; prompt passage to issue is earnestly solicited.

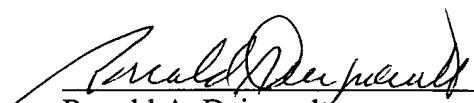
The Examiner is invited to contact the undersigned at 202-326-0330 to resolve any outstanding issues following entry of the present amendment.

Respectfully submitted,

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Easy Balance I

Background

Aquaria without regular water change suffer from chemical and biochemical alterations of water chemistry.

- Reduction, up to complete loss of carbonate hardness (KH), due to acid production by the ammonia oxidation (first nitrification step)

- Secondary effects:

- * pH reduction down to pH 3 – 4 („acid drop“, acid catastrophe)
- * reduced buffer capacity up to complete loss
- * very instable water conditions
- * dramatic increase of mortality of fish and plants

- Steady increase of nitrate
- Steady increase of phosphate
- Deficiency of trace elements for plants and bacteria
 - Possible secondary effects
 - * bad plant growth
 - * inadequate filter performance, nitrification

Easy Balance II

Background cont.

- The danger of the „acid catastrophe“ is high for very soft aquarium water and very soft tap water and high stocking density (fish), it is lower with harder (higher KH) water conditions and medium or average stocking density (fish)
- In hard (KH) water aquaria and with hard (KH) tap water especially under conditions, where the evaporation rate is high (totally open aquaria) the development of chemical water conditions could be completely different:
 - increase of KH despite nitrification
 - stable to increasing pH values
 - increase of GH and other dissolved salts (chlorides, sulfates)
 - „double“ increase of nitrate (from added tap water and nitrification)
 - the other changes, e. g. increase of phosphate, deficiency of trace elements are comparable to soft water conditions.

To summarize:

Aquaria kept over extended periods without water change have the tendency to built up unfavourable, unnatural water conditions which in the extreme develop to become harmful, or even lethal for fish, plants, microorganisms.

Easy Balance III

General Objective and Benefit

The regular treatment of aquaria with Easy Balance will stabilize important chemical parameters and keep the aquarium water in chemical and biological balance.

Single Parameters, Functions

1. Carbonate Hardness

By an innovative KH additive Easy Balance adds the required amount of KH to prevent an acid drop, KH drop even under soft water conditions.

If the Nitrate Remover is applied even the nitrification induced KH losses are compensated

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Easy Balance IV

Single Parameters, Functions cont

2. pH

Easy balance stabilizes the pH at sufficiently high levels. It prevents the reduction of pH („acid drop“) to biologically harmful values.

Under soft water conditions ($KH < 5^{\circ}dH$) the pH is stabilized in the range 7.3 - 8.0, under medium hard to hard water conditions ($KH > 8^{\circ}dH$) the pH is stabilized in the range 7.9 - 8.4.

pH changes within these ranges are caused by changes in the CO_2 concentration, due to aeration, CO_2 production in the aquarium.

Easy Balance IV

3. Nitrate

1. Easy Balance without additional Nitrate Remover

Easy Balance adds organic compounds to the aquarium water which produce a very small part of denitrification, which increases with growing nitrate concentration.

In an average aquarium, e. g. a 70 l aquarium stocked with 14 small to medium sized fish, the nitrate concentration stays constantly after it has reached $100 - 140 \text{ mg/l}$, which is still tolerable for aquarium fish.

The final NO_3^- concentration is dependent on the stocking density with fish.

Easy Balance VI

3. Nitrate

2. Easy Balance with additional Nitrate Remover

If the Nitrate Remover is buried into the gravel the nitrate concentration stays approximately at the starting value or goes even down to 5 - 20 mg/l NO_3^- .

This benefit completes the performance of Easy Balance related to nitrate and supports strongly the conversation of KH and pH because the denitrification process caused by the Nitrate Remover compensates the KH losses by nitrification.

The Nitrate Remover retains its performance only if partly anoxic zones in the gravel are formed. Any undergravel filtration system will prohibit this process.

Easy Balance VII

4. Phosphate

Easy Balance adds an innovative liquid phosphate removing compound which eliminates phosphate by biological and chemical processes.

In a 70 l aquarium with a normal stocking density (14 fishes) the phosphat concentration was constantly kept below 0.1 – 0.2 mg/l.

5. Essential Trace Elements

Easy Balance compensates the steady losses of essential trace elements, e. g. Fe, Mn, Zn, Ni, Cu, V, Mo, Co, B, Br, J, Sn, Li necessary for plants and microorganisms.

Easy Balance VIII

6. Other Water Parameters: Salting up effect

If aquaria with a high evaporation rate (e. g. open aquaria without glass covers, hoods) are kept without water changes the steady replacement of evaporated water by tap water will introduce extra portions of the dissolved materials, e. g. GH and KH forming species, chlorides, sulfate, nitrate, sodium, potassium.

In open aquaria this could reach an additional 100 - 150 % of the starting concentrations within 6 months. Many of these added electrolytes cannot be influenced by Easy Balance, e. g. Ca^{2+} , Mg^{2+} , HCO_3^- , SO_4^{2-} , Cl^- , Na^+ , K^+ .

Their increase will be gradually and therefore easily tolerated by the fish and plants. If the KH also increases and is not overcompensated by nitrification, this a positive change, leading to extra chemical stability.

The described „salting up“ effect is reduced if aquaria with glass covers or hoods are used and it is eliminated, if the water used to refill evaporated water is distilled water or reverse osmosis water.

Easy Balance IX

7. Maintenance advices which improve or support the Easy Balance treatment

In general these advices cover aspects which should be part of any good aquarium maintenance:

- medium, not too high stocking density, e. g. 20 small to medium fishes in a 100 l aquarium
- sufficient living water plants
- weak but continuous aeration
- glass cover or hood to minimize evaporation losses (to avoid too intensive salting up effects)
- distilled water or reverse osmosis water for filling up evaporation losses
- adequate filtration system with sufficient biodegradation performance
- regular cleaning of filter to keep the turnover $> 50\%$ of the maximum flow
- despite KH stabilization in heavily stocked or overfed aquaria a monthly KH check is adviseable
- if the Tetra Nitrate Remover is applied, no undergravel filter system should be integrated (prohibits the formation of necessary anoxic zones in the gravel)